

WHAT IS CLAIMED IS:

1 1. A method of forming a conductive structure within
2 an integrated circuit comprising:

3 forming a conformal tungsten layer over a
4 dielectric layer and within openings within the dielectric
5 layer;

6 forming a protective barrier layer over the
7 tungsten layer, wherein the protective barrier layer
8 comprises a material for which removal by chemical
9 mechanical polishing is primarily mechanical; and

10 removing at least portions of the protective
11 barrier layer and the tungsten layer by chemical mechanical
12 polishing.

13 2. The method as set forth in Claim 1 wherein the
14 step of forming a protective barrier layer over the
15 tungsten layer further comprises:

16 forming a titanium or titanium nitride layer on
17 the tungsten layer.

1 3. The method as set forth in Claim 2 wherein the
2 step of removing at least portions of the protective
3 barrier layer and the tungsten layer by chemical mechanical
4 polishing further comprises:

5 removing portions of the tungsten layer overlying
6 the dielectric layer without removing portions of the
7 tungsten layer within the openings within the dielectric
8 layer.

1 4. The method as set forth in Claim 3 wherein the
2 step of removing at least portions of the protective
3 barrier layer and the tungsten layer by chemical mechanical
4 polishing further comprises:

5 removing all of the protective barrier layer.

1 5. The method as set forth in Claim 3 wherein the
2 step of removing at least portions of the protective
3 barrier layer and the tungsten layer by chemical mechanical
4 polishing further comprises:

5 removing portions of the protective barrier layer
6 overlying dielectric regions between the openings within
7 the dielectric layer.

1 6. The method as set forth in Claim 5 wherein the
2 step of removing at least portions of the protective
3 barrier layer and the tungsten layer by chemical mechanical
4 polishing further comprises:

5 after removing portions of the protective barrier
6 layer overlying the dielectric regions between the openings
7 within the dielectric layer, removing portions of the
8 tungsten layer overlying the dielectric regions between the
9 openings within the dielectric layer; and

10 during removal of portions of the tungsten layer
11 overlying the dielectric regions between the openings
12 within the dielectric layer, removing portions of the
13 protective barrier layer overlying the openings within the
14 dielectric layer.

1 7. The method as set forth in Claim 2 wherein the
2 step of removing at least portions of the protective
3 barrier layer and the tungsten layer by chemical mechanical
4 polishing further comprises:

5 removing portions of the protective barrier layer
6 and the tungsten layer overlying dielectric regions between
7 the openings within the dielectric layer to planarize
8 remaining portions of the tungsten layer and remaining
9 portions of the protective barrier layer, if any, with the
10 dielectric layer.

1 8. A portion of an integrated circuit structure
2 comprising:

3 a dielectric layer over a substrate;
4 a conformal tungsten layer over the dielectric
5 layer and within openings within the dielectric layer; and
6 a protective barrier layer over the tungsten
7 layer, wherein the protective barrier layer comprises a
8 material for which removal by chemical mechanical polishing
9 is primarily mechanical.

10 9. The portion of an integrated circuit structure as
11 set forth in Claim 8 wherein the protective barrier layer
12 is titanium or titanium nitride.

13 10. The portion of an integrated circuit structure as
14 set forth in Claim 8 wherein portions of the tungsten layer
15 within the openings are thicker than portions of the
16 tungsten layer over the dielectric layer.

17 11. The portion of an integrated circuit structure as
18 set forth in Claim 8 wherein the protective barrier layer
19 overlies the entire tungsten layer.

1 12. The portion of an integrated circuit structure as
2 set forth in Claim 8 wherein the protective barrier layer
3 overlies portions of the tungsten layer within the openings
4 but not portions of the tungsten layer over the dielectric
5 layer.

1 13. The portion of an integrated circuit structure as
2 set forth in Claim 8 wherein the tungsten layer has a
3 thickness of between about 4500 and 8000 angstroms.

1 14. The portion of an integrated circuit structure as
2 set forth in Claim 8 wherein the protective barrier layer
3 has a thickness of between about 100 and 800 angstroms.

1 15. The portion of an integrated circuit structure as
2 set forth in Claim 8 wherein at least one opening within
3 the dielectric layer is sized to form a capacitive
4 electrode from tungsten within the at least one opening.

1 16. A portion of an integrated circuit structure
2 comprising:

3 a dielectric layer having an opening therein;

4 tungsten within the opening; and

5 a portion of a protective barrier layer over a
6 central region of the tungsten within the opening.

1 17. The portion of an integrated circuit structure as
2 set forth in Claim 16 wherein the portion of the protective
3 barrier layer comprises a material for which removal by
4 chemical mechanical polishing is primarily mechanical.

5 18. The portion of an integrated circuit structure as
6 set forth in Claim 16 wherein the portion of the protective
7 barrier layer is titanium or titanium nitride.

8 19. The portion of an integrated circuit structure as
9 set forth in Claim 16 wherein the tungsten and the portion
10 of the protective barrier layer form an upper surface which
11 is substantially planar with an upper surface of the
12 dielectric layer.

20. The portion of an integrated circuit structure as set forth in Claim 16 wherein the opening within the dielectric layer is sized to form a capacitive electrode from the tungsten within the opening.

Table 1. Demographic characteristics of the study population	
Age (years)	65.0 ± 10.0
Gender	
Male	100
Female	100
Education (years)	12.0 ± 2.0
Marital status	
Married	100
Divorced	100
Widowed	100
Single	100
Occupation	
Retired	100
Unemployed	100
Employed	100
Income (USD/month)	1,200 ± 300
Health status	
Good	100
Fair	100
Poor	100
Smoking status	
Smoker	100
Non-smoker	100
Alcohol consumption	
Drinker	100
Non-drinker	100
Comorbidities	
Hypertension	100
Diabetes	100
Coronary artery disease	100
Chronic kidney disease	100
Chronic liver disease	100
Chronic lung disease	100
Chronic pain	100
Chronic depression	100
Chronic anxiety	100
Chronic fatigue	100
Chronic insomnia	100
Chronic constipation	100
Chronic diarrhea	100
Chronic cough	100
Chronic asthma	100
Chronic sinusitis	100
Chronic rhinitis	100
Chronic otitis media	100
Chronic ear pain	100
Chronic eye pain	100
Chronic nose pain	100
Chronic throat pain	100
Chronic mouth pain	100
Chronic skin pain	100
Chronic joint pain	100
Chronic muscle pain	100
Chronic nerve pain	100
Chronic bone pain	100
Chronic head pain	100
Chronic neck pain	100
Chronic back pain	100
Chronic pelvic pain	100
Chronic genital pain	100
Chronic urinary pain	100
Chronic rectal pain	100
Chronic anal pain	100
Chronic vaginal pain	100
Chronic penile pain	100
Chronic testicular pain	100
Chronic ovarian pain	100
Chronic uterine pain	100
Chronic fallopian pain	100
Chronic cervix pain	100
Chronic vagina pain	100
Chronic penis pain	100
Chronic testis pain	100
Chronic ovary pain	100
Chronic uterus pain	100
Chronic fallopian pain	100
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Chronic vagina pain	100
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Chronic ovary pain	100
Chronic uterus pain	100
Chronic fallopian pain	100
Chronic cervix pain	100
Chronic vagina pain	100
Chronic penis pain	100
Chronic testis pain	1